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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/573,888	11/13/2006	Hiroyuki Tsuda	060247	9923
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EXAMINER				
LAM, HUNG Q				
ART UNIT		PAPER NUMBER		
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MAIL DATE		DELIVERY MODE		
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/573,888

Applicant(s)

TSUDA, HIROYUKI

Examiner

HUNG LAM

Art Unit

2883

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12/10/2008.
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-7,9 and 11 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1,3-7,9 and 11 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-8508)
Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____

Status of the Application

Claims 2, 8 and 10 have been cancelled.

Claims 1, 3-7, 9 and 11 are pending.

Response to Argument

1. Applicant's Appeal Brief Filed on December 12, 2008 has been fully reviewed at a Conference conducted on March 18, 2009. It was agreed upon the Conference that this case was not ready to proceed to the Board, and Examiner will reopen the prosecution, even though, the Appeal Brief's Arguments/Amendments was found not persuasive and prior arts of record are still deemed good/applicable. This decision was because of Non-compliant issues with the present claims. At first, Claim 1 is not compliant, since Applicants mistakenly deleted without indicated limitations that presented in the previous Amendments (i.e. "Amendments To the Claims" before the Final Office Action). Secondly, Claim 11 should not be entered in the Advisory Action for "Amendment After Final", since Applicant added limitation of cancelled claim 10 which is dependent on Claim 1, into Claim 11, and Claim 11 thereby comprises a new issue not previously presented. To simplify these issues, Examiner reopens the prosecution and amends Claim 1 as authorized by Applicants to avoid future Non-Compliant issue. Please see Examiner's Amendment below.

2. Further, the Examiner has cited new references and new grounds of rejection are introduced accordingly.

EXAMINER'S AMENDMENT

An Examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this Examiner's amendment was given in a telephone interview with Attorney William L. Brooks (Reg. No. 34,129), on the 20 of March, 2009, to add/indicate a cancelled limitation in claim 1, since Applicants have mistakenly deleted it without indicated in the Amendments After Final.

The application has been amended as follows:

1. (Examiner amended) An optical functional waveguide comprising:

a substrate;

a clad formed on said substrate;

a core which is formed in said clad and serves as an optical path;

a plurality of lens-shaped groove structures formed so as to align at a predetermined interval along the optical path and fragmentize the optical path and being filled with a material having a refractive index temperature coefficient different from that of said core; and

a heater electrode interposed between said plurality of groove structures provided along the optical path in an alternating S-shaped arrangement for controlling temperature of said material.

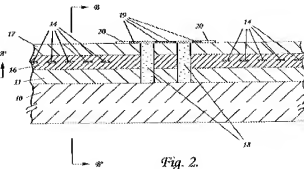
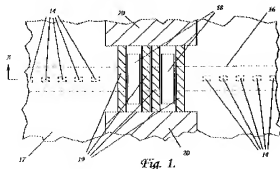
Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 3-5, 9 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Clapp et al.** (US. Pat. 6,459,533) in view of **Kamei et al.** (US. Pub. 2004/0126052)

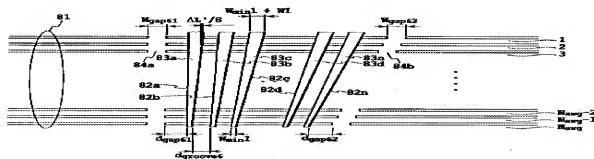
Regarding claims 1, 3 and 11, Clapp et al. disclose an optical functional waveguide comprising a substrate 10; a clad 11 formed on said substrate 10; a core 16 which is formed in said clad 11 and serves as an optical path; a plurality of groove structures 18 formed so as to align at a predetermined interval along the optical path and fragmentize the optical path and being filled with a material having a refractive index temperature coefficient different from that of said core 16; and a heater electrode 19 interposed between said plurality of groove structures 18 provided along the optical path for controlling temperature of said material ("abstract", col. 3 lines 16-23, col. 4 lines 30-49, col. 5 lines 44-47, Fig. 1, Fig. 2 and Fig. 6).



Reproduced from US. Pat. 6,459,533.

Clapp et al. do not explicitly disclose that plurality of groove structures having lens-shaped or wedge-shaped.

Kamei et al. teach optical functional waveguide circuit comprising a cladding layer 42 formed on a substrate 41, a core 43 which is formed in said clad and serves as an optical waveguide/path ([0190], and Fig. 29B); a plurality of groove structures 44a-44d formed so as to align at a predetermined interval along the optical waveguide/path 43 and fragmentize the optical waveguide/path 43 and being filled with a material having a refractive index temperature coefficient different from that said core 43 ([0189], [0192], Fig. 29B). **Kamei et al.** further disclose that pluralities of groove structures can be in lens-shaped (i.e. grooves 418a-418n) or wedge-shaped (i.e. grooves 82a-82n); and at least one of the end faces of said pluralities of groove structures is tilted from a position perpendicular to the optical path, wherein said groove structures act as lenses to magnify and reduce beam spot sizes for lightwave launches through the grooves ([0222]-[0231], [0296]-[0300], Fig. 32 and Fig. 40).



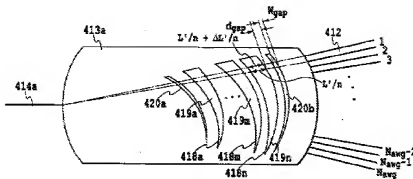


FIG. 40

Reproduced from US. Pub. 2004/0126052

It would have been obvious to the one having ordinary skill in the art at the time the invention was made to use the teachings of the serpentine (snake or photo resist patterns) heater electrode patterns of **Kamei et al.** to modify the shape of pluralities of groove structures in **Clapp et al.** wherein the shape of said pluralities of groove structures can either have lens-shaped or wedge-shaped. The motivation for doing so is to reduce the excess loss that involved in the propagation of the lightwave through the slab optical waveguide including the loss components (Kamei et al. [0231] and [0300]).

Regarding claims 4 and 5, Kamei et al. further disclose that an optical modulator comprising the optical functional waveguide according to claim 1 which modulates the phase of light since “the grating interaction may be changed by a distributed thermally induced phase shift as a function of the heater current” (col. 12 lines 8-18 and col. 16 lines 13-15); and an arrayed waveguide grating 552 comprising the optical functional waveguide according to claim 1 in a slab waveguide 553 (Kamei et al. [0316], and Fig. 42).

Regarding claim 9, in accordance with the rejection of claim 1, Kamei et al. further disclose that groove structure 418a-n is provided at a slab waveguide of a coupling portion of the

slab waveguide 413a and a single mode waveguide 414a (Kamei et al, [0291]-[0294], and Fig. 39-40).

Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over and **Clapp et al.** and **Kamei et al.** further in view of **Kurokawa et al.** (US. Pat. 6,122,419).

Regarding claims 6 and 7, **Clapp et al.** and **Kamei et al.** further disclose the claimed invention except for a dispersion compensation circuit comprising the optical functional waveguide according to claim 1 in the vicinity of a coupling portion that two arrayed waveguide grating are coupled to each other in a cascade, and a mirror provided in a waveguide and arranged in the vicinity of a spectrum plane wherein the optical functional waveguide according to claim 1 is arranged in the vicinity of said mirror.

Kurokawa et al. teach a dispersion compensation circuit comprising mirror 110 attached to waveguide of slab waveguide 107 of arrayed waveguide grating 200 and arranged in the vicinity of a plane that produce reflecting spectrum where the slab waveguide 107 is attached to that vicinity (col. 24 lines 32-45, col. 30 lines 2-3, and Fig. 20); and **Kurokawa et al.** also disclose a coupling portion 17 a rewritable pattern glass substrate that two array waveguide grating 11 and 15 are coupled to each other in series (col. 21 lines 1-28, and Fig. 10).

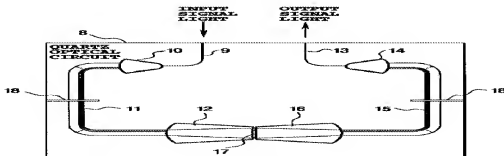
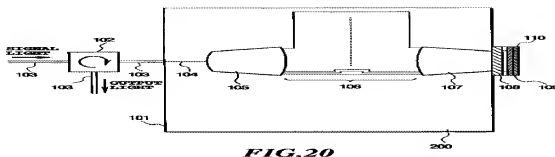


FIG. 10



Reproduced from US. Pat. 6,122,419.

It would have been obvious to the one having ordinary skill in the art at the time the invention was made to combine these teachings of **Kurokawa et al.** and using them to modify the device suggested by **Clapp et al.** and **Kamel et al.** by incorporating the optical functional waveguide to a coupling portion of a dispersion compensation circuit that enables two arrayed waveguide gratings to be coupled in series, and further including a mirror provided in a waveguide of the optical functional waveguide that arrange in the vicinity of a plane that produces the reflection spectrum. The motivation for doing so is “to distribute the incident light on a straight line and making desired amplitude or phase modulation of the light according to the position on the straight line and reflecting the light” so that it is possible to control the dispersion compensation amount of a requirement (Kurokawa et al., “abstract”, and col. 3 lines 6-9).

Cited Prior Art

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Liu (US. Pat. 7,106,922).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hung Lam whose telephone number is 571-272-9790. The examiner can normally be reached on M - F 08:30 AM - 05:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank Font can be reached on 571-272-2415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Hung Lam/
Patent Examiner, Art Unit 2883
03/30/2009

/CHARLIE PENG/
Primary Examiner, Art Unit 2883